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ABSTRACT

Chile has introduced a system of merit awards to schools called the National System to Evaluate School Performance (SNED). This paper provides information on the characteristics of the SNED approach to providing incentives to improve the quality of education. Key features of the SNED system are as follows: Awards go to school establishments, not individual teachers; schools are stratified so competition is between relatively comparable establishments; awards go to schools constituting 25 percent of the enrollment in each stratum; Chile's national student assessment system (SIMCE) provides an important part of the basis on which school performance is evaluated; awards are fully competitive; and teachers and school directors express reasonable satisfaction with the SNED system. The distribution of SNED awards across schools receiving voucher payments is roughly equal. A system of merit awards to schools involves lower information and transaction costs than merit pay to individual teachers. A problem that may arise is how to manage the awards over time. Another potential problem would arise if teachers altered their behavior in undesirable ways to win awards, such as focusing teaching efforts only on the subjects tested in SIMCE; there is no evidence of this behavior at this time. (RT)

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Education Reform and Management Publication Series

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Robert W. McMeekin

Vol. III – No. 1 – June 2000

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About the Author

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Dr. McMeekin holds a Ph.D. in political economy and government and a master's degree in public administration from Harvard University, an M.A. in international relations from the University of Kentucky and a bachelor's degree from Yale University. He is the author of several books, and numerous articles and reports on education finance, management and planning.

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Acronyms

CEA	Center for Applied Economics
DEPROV	Provincial Education Department
IDB	Inter-American Development Bank
JUNAEB	National Organization for Student Aid and Scholarships
MECE	Improvement of Educational Equity and Quality
PME	School Improvement Project
PER	Program to Evaluate School Results
SEREMI	Regional Secretariat of Education
SIMCE	System for Measuring Educational Quality
SNED	National System to Evaluate School Performance

Executive Summary

Chile has introduced a system of merit awards to schools called the National System to Evaluate School Performance (Sistema Nacional de Evaluación del Desempeño de los Establecimientos Educacionales Subvencionados or SNED). The SNED system has been carefully designed and well implemented. It avoids many of the problems associated with merit pay for individual teachers. As it enters its third round (every two years) of measurement and awards, it appears to be accepted by key actors in the education sector. This paper provides information on the characteristics of this approach to providing incentives to improve the quality of education.

Key features of the SNED system include the following:

Awards go to school establishments, not individual teachers. This avoids many of the problems associated with merit pay to individual teachers.

Schools are stratified so that competition is between relatively comparable establishments. Separation of schools into homogenous groups makes the competition more equitable. Teachers feel this is desirable.

Awards go to schools constituting 25 percent of the enrollment in each stratum. Ninety percent of the awards are paid directly to all the teachers as bonuses. School directors may allocate the remaining 10 percent to outstanding teachers.

Chile's national student assessment system (SIMCE) provides an important part of the basis on which school performance is evaluated. SIMCE has been in operation for over a decade and is relatively well accepted in the education community. Its existence made the cost of establishing the SNED system reasonable.

Awards are based on an index composed of six factors. Each factor is made up of one or more indicators. Absolute levels of student learning, as measured by SIMCE, is one factor and counts for 37 percent of the total weight in the index. Changes in SIMCE scores since the last application of the tests is a second factor and counts for 28 percent of total weight in the index. The remaining factors constituting 35 percent of the weight are also largely based on education outcomes.

The awards are fully competitive. That is to say, schools may win repeatedly.

Chile's Ministry of Education has commissioned careful evaluations of the first two rounds of SNED. Changes have been made in the composition of the factors in the index and in their weights.

Teachers and school directors express reasonable satisfaction with the SNED system. One of the aspects of the evaluation sought opinions of teachers and directors. Reactions were generally favorable. The teachers' union does not object to the SNED system.

The distribution of SNED awards across schools receiving voucher payments, that is to say across both municipal (public) schools and private-subsidized schools, is roughly equal, although a slightly higher percentage of private-subsidized schools won awards. Municipal schools account for 69.1 percent of all schools receiving vouchers but received only 67.5 percent of the SNED awards, while private-subsidized schools represent 30.9 percent of all eligible schools and won 32.5 percent of the awards.

A system of merit awards to schools involves lower information and transaction costs than merit pay to individual teachers. The incremental cost of establishing the SNED system in Chile was low because the country's relatively high-quality system of standardized tests, covering 100 percent of the students at each level tested, was already in place and generally accepted in the education community.

One problem that may arise is how to manage the awards over time. The SNED system is fully competitive and schools can win awards repeatedly (although it is more difficult to show improvement in test scores as a school's average scores become higher.) There is a danger that teachers in schools that win awards in one application of SNED will be frustrated if their school do not win in subsequent rounds of SNED measurement and awards, or that teachers in schools experiencing great difficulties will lose hope that they can ever win and therefore not make efforts to improve.

Another potential problem would arise if teachers altered their behavior in undesirable ways order to win awards, such as focusing teaching efforts only on the subjects tested in SIMCE. Although there have not been indications of opportunistic behavior on the part of teachers, such behavior could emerge as teachers become better informed about SNED.

Introduction

There is widespread interest in both developed and developing countries in improving the efficiency and effectiveness of education systems. This interest has given rise to the idea of introducing market-like incentives into the education sector, bringing to bear the powerful forces of competition and the price system in order to enhance school performance. This has led to policy recommendations and experimental programs to encourage teachers to improve their performance, to enable parents to choose their children's school and thereby introduce competition into the marketplace for education, and to encourage development of programs that promote innovation and permit freedom from bureaucratic control. Introducing market incentives has met with success in some social sectors, especially health, and in other activities once considered public-sector responsibilities, such as prisons. Elementary and secondary education, however, have proved relatively resistant to attempts to introduce prices and markets.

Chile is experimenting with a "National System to Evaluate School Performance" (Sistema Nacional de Evaluación del Desempeño de los Establecimientos Educacionales Subvencionados or SNED) that provides merit awards to all the teachers in a school based largely on student outcomes. SNED differs from systems of merit pay for individual teachers. This paper provides a description of the SNED program and an analysis of how it is functioning. It is based on the work of the developers of SNED at the Chilean Ministry of Education, on evaluation studies of SNED commissioned by the ministry, and on a study commissioned by the Inter-American Development Bank.[1]

The SNED program, established on the basis of Law No. 19.410 of 1995, has carried out two rounds of measurement and awards since its inception (1996-97 and 1998-99) and is making preparations for the third round of measurement and awards for 2000-2001. The descriptive information about SNED in this paper relates mainly to the most recent application of SNED (1998-99). Information in Parts 2 and 3 on the reactions of school directors and teachers comes from the evaluation study conducted after the 1996-97 application of SNED. At this stage it is possible to comment on the design and implementation of SNED, although it is still too soon for the system to

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[1] Ministerio de Educación (1998): Heyl, Vivian and Marcela Guzman. "Evaluación del Desempeño, SNED," Santiago, Chile: Ministry of Education (processed). Ministerio de Educación (1998): Reconocimiento al Compromiso Docente. Ministerio de Educación (1997): Evaluation of SNED 1996-97, commissioned by the ministry, performed by Alejandra Mizala and Pilar Romaguera: "Evaluación de la Implementación y Resultados del SNED, 1996-97." Centro de Economía Aplicada, Facultad de Ingeniería Industrial, Universidad de Chile (processed). Mizala and Romaguera (1999) "Sistemas de Incentivos en Educación y la Experiencia del SNED en Chile". Trabajo producido como parte del proyecto "Los Maestros an América Latina: Carreras e Incentivos" de la Red de Centros de Investigación del Banco Interamericano de Desarrollo. Paper presented at an IDB conference in San José, Costa Rica, June 1999.

have had a demonstrable impact on student learning, either in schools that have won awards or in the system as a whole.

Part 1

A System for Evaluating School Performance

The Context of SNED

Several factors present in the Chilean context have important influences on the SNED system and, in the case of Chile's testing system, on the information costs of SNED.

Voucher System

Chile's education system has been the subject of extensive study, especially because of its national voucher system.[2] The military government decentralized control of schools to the municipal level beginning in 1980 and permitted establishment of private schools that receive the same voucher payments as municipal schools. Voucher payments are based on the number of students in attendance (verified by monthly on-the-spot checks) and the per-student stipends are equal for both municipal and private-subsidized schools. (Elite private schools whose unit costs are higher than the level of the voucher are excluded from receiving vouchers.) In 1997 there were 1.84 million children enrolled in municipal schools that received voucher payments and 1.1 million students in the private-subsidized schools.

Testing System

Another feature of Chile's education system, which is especially important for the SNED program, is its System for Measuring the Quality of Education (Sistema de Medición de la Calidad de la Educación, SIMCE.) Introduced in 1988, SIMCE is a standardized test of Spanish and mathematics skills administered every two years to students at grades 4 (in even years) and 8 (in odd years) at the level of basic education.[3] More recently SIMCE tests also have been given at the second year of secondary education in 1994 and 1999. SIMCE provides information on student achievement. The tests are standardized, which makes possible meaningful comparisons between aver-

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[2] Recent publications on Chile's voucher system include: Carnoy, Martin and Patrick McEwan. "Choice between Public and Private Schools in Chile". Stanford University, School of Education, November, 1998 (processed). Taryn Rounds Parry. "Theory Meets Reality in the Education Voucher Debate: Some Evidence from Chile". Education Economics, vol. 5 no. 3 (December.1997), pp. 30-32, and Varun Gauri, School Choice in Chile: Two Decades of Educational Reform. University of Pittsburgh Press, Latin America Series, 1999.

[3] An earlier system of standardized tests, the Programa de Evaluación del Rendimiento Escolar (PER), was applied at the fourth and eighth grade levels from 1982 to 1984.

age SIMCE scores for a school between successive applications. Testing is almost universal but reporting is on the basis of school average scores, not individual student scores.

Education Reform Program

Chile has undertaken successive waves of education reform.[4] One of these, in the 1980s during the military regime, brought about the decentralization/privatization of education and establishment of the voucher system. The most recent reform has come about since the return of democracy in 1990 and focuses on improving the content and quality of education. This current major reform effort has four main aspects or "pillars": (1) extending the length of the school day, including the infrastructure investment to make the longer school day possible (double shifts are eliminated, which creates an immediate demand for classroom places); (2) programs to improve teaching and learning; (3) curricular reform; and (4) strengthening the teaching profession. Along with an extensive program of in-service teacher training, the SNED system of evaluation and merit awards is part of the fourth "pillar" of the reform: strengthening the teaching profession.

World Bank Education Projects

Since 1990 the World Bank has supported several important education projects in Chile. The first, known by the acronym MECE (Mejoramiento de la Equidad y Calidad de la Educación), financed improvements at the primary level and the second (informally called MECE Media) addressed secondary education.[5] An important aspect of the MECE projects was financing for small capital grants to schools, called Educational Improvement Projects (Proyectos de Mejoramiento Educativo, PMEs). PMEs were initially awarded on a competitive basis, but eventually all schools were able to win awards. The first application of SNED took account of the process by which a school prepared its PME but this has not been considered in later applications. These projects have stimulated educational innovations and have been part of a process that has raised the issues of educational equity and quality to the top of the country's policy agenda.

Description of the SNED System

General Design

SNED provides merit awards to basic and secondary school establishments. The funds must be used for bonuses to teachers. The awards are based on a school's performance as measured by

[4] A detailed analysis of Chile's education reform experience is provided in: Françoise Delannoy. "Education Reforms in Chile, 1980-1998: A Lesson in Pragmatism." Country Studies, Education Reform and Management Publication Series, Vol. I, No. 1 (June 2000).

[5] A third project for higher education has been approved but has little or no bearing on SNED.

an index comprised of six factors. The index includes the absolute levels of SIMCE scores and improvements since the last SIMCE tests, as well as other indicators of educational outcomes and a few process measures. Awards are made to the best-performing schools in each of a number of strata, which means that competition is between relatively comparable schools. SNED evaluations take place every two years and the awards are distributed over a two-year period. Any municipal or private-subsidized school is eligible to win an award, and may win in successive evaluations. That is to say, SNED awards are fully competitive. The information in the following sections is based on current procedures and incorporates changes implemented following two studies of the system that took place following the 1996-97 round of SNED.[6]

Awards Based on Index Scores

One of the interesting features of the SNED system is the use of quantitative indicators combined into an index as the basis for the awards. Data come from the SIMCE tests and a questionnaire given to parents at the time the tests are administered, a special survey carried out for the purpose of SNED, a report associated with subvention or subsidy payments to the school, and the Ministry of Education statistics unit. The index of school excellence includes six factors in which outcomes weigh heavily. Table 1 below presents these factors and the indicators used in calculating each factor.

The indicators used in calculating each of the factor scores have equal weight and are combined to obtain the school's rating in terms of each factor. There were changes in the indicators used to evaluate each factor between the 1996-97 and the 1998-99 applications of SNED. The system continues to be subject to modifications as changes in external circumstances or in policy priorities occur.

[6] Information in this section is derived from the following documents: Ministerio de Educación, Santiago, Chile. Heyl, Vivian and Marcela Guzman (1998), *op. cit.* Ministerio de Educación, Departamento de Comunicación Social (1999). Reconocimiento al Compromiso Docente. Ministerio de Educación: Mizala, Alejandra and Pilar Romaguera (1997), *op. cit.*, as well as from Mizala and Romaguera (1999), *op. cit.* (study commissioned by the IDB.)

Table 1: Specifications of Factors and Indicators Used in the SNED Index, 1998-99	
Factor	**Indicators**
Effectiveness	- Average SIMCE scores in cognitive area (Spanish & mathematics) - Integration of handicapped children into working life, with follow-up* - Mainstreaming handicapped students into regular classes, with follow-up*
Improvement	- Change in SIMCE scores, cognitive area, since last application
Initiative	- Establishment of council of teachers with meetings at least once each month - Monthly participation of rural teachers in micro-center meetings** - Development of "technical-pedagogical" activities in groups at least once each month - Establishment of a students' center and meetings at least once each month - School has an institutional plan ("proyecto educativo") for medium- to long-term development - School has arrangements with local employers to aid handicapped students' entry into employment* - Teaching practices that include work experience for handicapped* - Development of teachers' workshops
Improvement in Working Conditions	- School has full complement of teachers - Use of substitute teachers when regular teachers are absent
Equality of Opportunity	- Rate of retention (staying in school) of students - Rate of promotion of students - School practices differential grouping to help special needs students - Does the school practice discrimination (e.g. expulsion of students who repeat, of students who become pregnant, or expulsion of students during the school year)?*** - Incorporation of students with multiple deficits* - Incorporation of students with severe deficits*
Integration of Teachers, Parents and Guardians	- Parents and guardians satisfied with ("accept") the work of the teachers - Establishment of a parents' center

Source: Ministry of Education (1998): Heyl, Vivian and Marcela Guzman. "Evaluación del Desempeño: SNED", Cuadro N. 1, p. 8. Santiago, Chile: Ministry of Education (processed).

* Indicator used only for special education schools

** Indicator used only for rural, one-, two- or three-teacher schools

*** Discriminatory practice enters as a negative indicator

The factors themselves are weighted according to the scheme presented below. The weights given to each of the factors were subject to adjustment between the first and second rounds of SNED, based on the thorough-going evaluation commissioned by the ministry and carried out by the Centro de Economía Aplicada in 1997. Table 2 below shows the weightings in the two applications of the SNED system.

The main changes between the first two iterations of SNED are the important increase in the weight accorded to the factor "equality of opportunity" and the decrease in the total weight of SIMCE scores (both absolute and change since last administration) from 70 to 65 percent of the total value of the index. The changes were in response to the findings and recommendations emerging from the evaluation of SNED after the first round of application. Documents relating to

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the SNED system emphasize that the design of the SNED system is and should be flexible and subject to change between applications.[7]

Table 2: Weight of Factors in Two Applications of the SNED Index (in %)		
Factor	**1996-97**	**1998-99**
Effectiveness	40	37
Improvement	30	28
Initiative	6	6
Improvement in working conditions	2	2
Equality of opportunity	12	22
Participation by parents/guardians and teachers	10	5

Source: Ministerio de Educación, Departamento de Comunicación Social (1999). Reconocimiento al Compromiso Docente.

Stratification and Competition Within Homogenous Groups of Schools

An important aspect of the SNED system is that it establishes competition between schools that are roughly comparable in terms of the student populations they serve, the socioeconomic levels of the communities in which they are located, and other external factors that affect student outcomes. For this the schools are organized into "homogenous groups" in a two-stage process. First, schools are divided into four main categories: urban basic and rural basic schools, and urban secondary and rural secondary schools (the last can include schools that have both basic and secondary levels). Schools that provide only special education constitute a fifth category, but are evaluated on the basis of the index. There are sub-groups of schools within each category that are evaluated on the basis of different criteria: rural primary schools with single teachers or multigrade teaching, adult education schools, schools in penal institutions and free-standing pre-schools. The evaluation criteria for these subgroups are complex and differ depending on the type of school and level of education. For purposes of brevity and focus, this paper will not deal with them at length.

Once grouped into categories, schools within each category are divided into "homogenous groups" on the basis of statistical cluster analysis. This analysis considers variables that influence the schools' performance but are outside their control, such as average family expenditure on education, level of education of the parents, community characteristics, physical accessibility of the school and an "index of vulnerability" compiled by the entity responsible for distribution of scholarships and student aid (Junta Nacional de Auxilio Escolar y Becas or JUNAEB). The vulnerability index classifies the community the school serves according to the socioeconomic level of its families.

[7] Ministerio de Educación: Reconocimiento al Compromiso Docente, *op. cit.*, p. 5; Heyl and Guzman, "Evaluación del Desempeño (SNED): Establecimientos Educacionales Subvencionados". July 1998 (processed), pp. 4, 11-12.

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Schools are grouped using cluster analysis, which is described as follows:

> Cluster analysis is a statistical method that considers the socioeconomic and location variables corresponding to each educational establishment and, on this basis, groups the schools by minimizing the distance between the internal characteristics of each group and maximizing the distance between groups. The key concept in this method is that of distance, which in statistics is associated with variance. This method, through successive approximations, minimizes intragroup variance and maximizes intergroup variance, leading to an optimal grouping.[8]

SNED establishes homogenous groups within each of Chile's 13 regions in each of the categories above (urban basic, rural basic, and urban and rural secondary). Breakdown by region means that there is even greater similarity between schools in each stratum or comparison group than if the grouping process were nationwide. If there are fewer than ten schools in one of the four categories in a given region, there is only one group in this category. If there are as many as ten but less than a hundred schools, two groups are formed. If there are between 100 and 500 schools, three groups are formed and if there are five hundred or more schools, there are four groups in that category.

Awards

SNED ranks schools within each group according to their scores on the index and gives awards to schools in rank order, up to the point where the enrollment in the winning schools accounts for 25 percent of the enrollment in that group. Award funds may be used only for bonuses for teachers (including head teachers or school directors). Ninety percent of the funds are distributed to teachers on the basis of the number of hours worked. (This the most equitable basis for distributing awards, especially for secondary schools, where teachers may work less than a full day in a particular school. If primary school teachers in a school all work full time, the awards to each are equal.) The school director may allocate the remaining ten percent to the teachers who have made the most "outstanding" contribution to professional performance. The special awards made from the unallocated ten percent are explicitly designed to overcome the "free rider" problem of teachers who make little effort on behalf of the school's improvement program. Some documents indicate that the distribution of this final ten percent is based on decisions of "the education professionals in the establishment."[9] Other studies say the school director makes the decision, and that this has given rise to some controversy.

[8] Translated from Heyl and Guzman, *op cit.*, p. 6.
[9] *Ibid.* p. 3.

Approximately 31,000 teachers have received bonuses in each of the first two rounds of SNED awards. The average amount of the bonus per teacher per year was 225,000 Chilean pesos in 1999 (equal to approximately US$450 per year). The relatively low amount of the awards has the effect of keeping the SNED process from becoming too much of a "high-stakes" exercise. This reduces the incentives for opportunistic behavior on the part of the teachers, such as focusing teaching attention on only those subjects evaluated by SIMCE. Evaluation of SNED after one round of competition did not indicate instances of opportunistic behavior, but the same evaluation found that most teachers (even in winning schools) did not know much about SNED. In future rounds there may be more of a tendency toward opportunism.

Winning schools are identified every two years. SNED makes award payments once each quarter during the two year period. The number of establishments that won awards was 2,285 during the first two-year period, decreasing to 1,826 during the 1998-99 SNED exercise. Total payments have increased slightly each year, reflecting both an increase in enrollments and a modest adjustment for price changes. The total payment in 1998 was 6,493 million Chilean pesos (roughly US$16.2 million) or approximately one percent of the total amount of payments to municipal and private schools receiving the voucher payments.

Municipal and private-subsidized schools compete directly for SNED awards. The distribution of awards between these two sub-sectors did not differ greatly. The portion of private-subsidized schools receiving awards was slightly higher than in the case of the municipal schools. This relationship varied between regions, with the municipal sector receiving a slightly higher share of the awards in two of the thirteen regions of the country. Few private-subsidized schools have been established in remote rural or urban slum neighborhoods, so the municipal sector is more heavily represented in communities with low socioeconomic status. The stratification system is designed to assure that schools compete against peers, but there can still be differences within a region in the distribution of awards between municipal and private-subsidized schools. Table 3 below shows the percentage of schools in each sector and the percentage of awards going to that sector for the 1998-99 application of SNED.

Table 3: Distribution of SNED Awards
Between Municipal and Private Subsidized Schools, 1998-99

Municipal Schools		Private Subsidized Schools	
% of Schools	% of Awards	% of Schools	% of Awards
69.1	67.7	30.9	32.3

Source: Data provided by the Ministerio de Educación , Santiago, Chile

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Viewed in terms of enrollment shares, municipal schools accounting for 21.5 percent of total municipal enrollment were winners while private-subsidized schools with 29.7 percent of total enrollment in this category won awards.

The Information Base for SNED[10]

The most important source of information on educational outcomes is the SIMCE tests. The tests of Spanish and mathematics administered at 4th, 8th and 10th grade levels produce school average scores that account for 65 percent of the total value of the index (including both the cross section and longitudinal comparisons.) A special survey carried out for SNED in 1997 provides data used for the indicators that measure the "Initiative," "Equality of Opportunity" and "Participation" factors. School data, which do not change greatly from year to year, come from regularly-reported statistics and are used for the "Working Conditions" factor, and the rates of student survival and promotion used for the "Equality of Opportunity" factor. Other information on within-school activities and practices for the "Equality" factor come from the SNED survey. For the final factor, "Participation and Integration of Teachers, Parents and Guardians," information comes from a form ("Ficha") completed by school directors in connection with the SIMCE tests and from a special questionnaire completed by the parents.

Data for stratification and grouping of schools into homogenous groups come from the ministry statistics unit, the "Index of Vulnerability" compiled for JUNAEB, and the SIMCE ficha that is completed by school directors. This last provides information on family expenditures on education, parents' education levels, and the distance the child has to travel to reach the school. Chile offers an unusually rich body of data, especially the outcome data from the SIMCE tests, that is not equaled in most other Latin American countries. This has lowered the incremental cost of the information needed to establish the SNED system.

[10] Information on data sources for the index comes from Ministry of Education, Heyl and Guzman (1998), *op. cit.*, Cuadro No. 1, p. 8. Data sources for stratification are given in Ministry of Education (1998), Reconocimiento del Compromiso Docente, *op. cit.* pp. 6-7.

Part
2

Evaluation of the SNED Experience

The design and management of the SNED system has been well-informed, sophisticated and careful. The Ministry of Education commissioned a body of evaluation studies of both the design of the SNED system and its implementation. Studies of the adequacy of the design and the implementation of SNED were carried out following the 1996-97 application and another evaluation followed the1998-99 round of SNED. The ministry commissioned the Centro de Economía Aplicada (Center for Applied Economics or CEA) of the Industrial Engineering faculty of the University of Chile to carry out much of the evaluation work.[11] The studies aimed to improve the SNED system by examining the design and methodology of the system, the implementation process, the information used, the attitudes of actors toward the process, behavioral-motivational factors, the time dimension, and costs.

Following the first (1996-97) round of SNED, CEA was commissioned to conduct two studies dealing with not only system design but also the perceptions of the actors involved in SNED (school directors, teachers, regional staff) of how the system functions in practice. In addition to information deriving from SNED itself, this study drew upon information from in-depth interviews, focus groups and surveys developed for the evaluation. Information gathering was carried out in a sample of three of Chile's 13 regions, including the large metropolitan region around Santiago. Within these, the study stratified the schools for in-depth study so as to include both municipal and private-subsidized schools and those that won awards as well as those that did not.

The evaluation of the design of SNED included a review of international literature on providing incentives for school improvement. In this review the evaluators identified the problems associated with merit payments to individual teachers; (1) the difficulty and transaction costs associated with measuring the contribution of individual teachers, (2) the possibility of opportunistic behavior on the part of teachers; and (3) the need to include other variables in addition to pure student achievement. On the basis of their analysis of the findings of studies such as Murnane and Cohen

[11] This section summarizes the findings of the evaluation, as presented by Mizala and Romaguera (1999) *op. cit.* The Centro de Economía Aplicada (CEA) is part of the Industrial Engineering Department of the Faculty of Physical Sciences and Mathematics of the University of Chile. The principal investigators for the study were Alejandra Mizala and Pilar Romaguera, both of CEA.

(1986),[12] Hanushek (1986)[13] and Richards and Ming Sheu (1992),[14] it was found that the SNED system avoids the main problems associated with merit pay to individuals and incorporates features that international research finds positive.

Key Findings of the 1996-97 Evaluation of SNED

Design and Methodology

1. The evaluation praised the establishment of homogenous groups so that schools compete with others in similar circumstances. An important recommendation was that the homogenous groups be established within each region, not for the country as a whole.
2. There should be changes in the weighting of factors used in formulating the SNED index. (Table 2 above shows the changes that were made.)
3. There should be improvements in the factors, especially incorporation of more and better indicators.
4. All indicators should be normalized to improve the calculation of the index.
5. Information-gathering instruments should be refined so as to improve gathering data for the index.

Implementation

Evaluation of how well the system is being implemented was based in part on questionnaires, in-depth interviews and focus groups. Interviewees and focus group participants came from both municipal and private-subsidized schools. The evaluators also consulted representatives of the Regional Secretariats of Education (SEREMIs) and Provincial Departments of Education (Departamentos Provinciales de Educación or DEPROVs) as well as knowledgeable people in the central Ministry of Education. The findings and recommendations of this phase of the study were the following:

1. There is notable consensus that a system for evaluating school performance is a good idea, although there were suggestions for improvement.
2. Respondents approved linking the evaluation of performance with the payment of monetary awards.

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[12] Murnane, Richard and David Cohen (1986). "Merit Pay and the Evaluation Problem: Why Most Merit Pay Plans Fail and a Few Survive". Harvard Education Review, vol. 56, No. 1, pp. 1-17.
[13] Hanushek, E. A. (1986). "The Economics of Schooling: Production and Efficiency in Public Schools." Journal of Economic Literature, vol. 24, pp. 1141-77.
[14] Richards, C. and S. Ming Sheu (1992). "The South Carolina School Incentive Award Program: A Policy Analysis." Economics of Education Review, vol. 11, no. 1.

3. Stratification into homogenous groups so that schools are competing against equals is highly desirable.
4. Respondents recommended modifying the weighting of factors in the index and the way some factors are measured.
5. Respondents urged that the evaluation system be transparent and that schools have access to the information used to determine which schools receive awards.
6. Regional and provincial authorities recommended that they have greater participation in the process, especially in identifying the homogenous groups in their regions.
7. Schools that won awards suggested that, in addition to the money awards themselves, that there should be greater publicity attached to winning the awards so that parents and the community at large should be aware that their school was a winner.

Changes as a Result of the Evaluation

The most important changes between the first two applications of SNED were: (1) the shift in weightings shown in Table 2 above, which reduced the weight of factors based solely on SIMCE scores from 70 to 65 percent and increased the weight of the "Equality of Opportunity" factor; and (2) formation of homogenous groups at the regional rather than the national level. In accordance with the evaluators' suggestions, the SNED system made technical changes to standardize all values used in calculating the index and to use more and different indicators for the "Initiative" and "Equality of Opportunity" factors. Certain other changes affected only the basis for scores for single-teacher and multigrade rural schools, free-standing pre-schools, special education schools, adult education and prison schools.

Part
3

School Directors' and Teachers' Opinions of SNED

The evaluation study gathered qualitative information through interviews with school directors and used survey questionnaires and focus groups to obtain data from teachers and school directors.[15] The purpose of gathering this qualitative information was to assess: (1) the perceptions school directors and teachers have of the SNED system, (2) whether SNED contributes to improved teaching performance, and (3) the degree to which SNED encourages competition between schools to improve educational quality. The findings provide interesting insights into reactions to SNED at the school level, both in schools that won awards and in those that did not.

Views of School Directors

School directors' perceptions are interesting because they are both teachers and, in their supervisory roles, informed observers of how teachers react to the introduction of merit awards. The interview-based information provides insights not available from the survey.

The general attitude of school directors toward the SNED system is positive. This includes directors of both schools that won awards and those that did not. The directors, whose point of view is somewhat aligned with "management", see the SNED evaluation system as a way to recognize differences in the performance of schools. The design of the system is generally satisfactory, in their view, although they are somewhat concerned about the heavy emphasis accorded to SIMCE scores through the combined weight of the "Effectiveness" and "Improvement" factors in the SNED index. In this context some directors expressed the view that some schools practice selection of students (even though this is against regulations and the SNED system itself penalizes such behavior.)

Directors are in favor of a system of monetary rewards for teachers. In their view teachers' salaries are too low and awards under the SNED system represent a partial step toward rectifying this problem. Virtually all directors approve of making the awards to school establishments rather than

[15] The information on directors' and teachers' views of the SNED come from Mizala and Romaguera (1999), *op cit*., Sections IV and V, pp. 18-39.

to individual teachers, so as not to undermine teamwork among teachers in a school. It is interesting that, although SNED regulations reserve ten percent of a school's award to be allocated to "outstanding" teachers at the director's discretion, a substantial majority of directors said that they distribute this ten percent on the same basis as the main portion of the award-equally across all teachers at the school. This tends to support findings of earlier studies of merit pay to individual teachers that the difficulties of making and justifying individual awards and the negative effect on teamwork and feelings of solidarity in the school outweigh any positive effects of individual rewards. The directors indicated they would oppose a system of rewards to individual teachers.

The prestige of their school and its ability to attract students is important to school directors. Some directors of winning schools made efforts to publicize the awards but others did not. There was skepticism about whether the SNED awards would have an impact on parents' decisions about where to enroll their children. More important, in the directors' opinions, was a school's long-term reputation in the community, especially its role in developing strong values in the students. Directors feel that families judge a school on the basis of its values, the commitment of teachers, what other families are choosing, and pragmatic factors such as distance from home to school, as well as achievement scores. The SNED awards cannot alter more deeply-rooted reality, in their opinion.

Directors' Comments on Teachers' Reactions

When asked their opinions about teachers' views of SNED, the directors gave a somewhat different picture. In the directors' opinion, teachers have more reservations about a system based heavily on standardized achievement tests. They mentioned a "teachers' culture" (cultura docente) in which teachers see themselves as motivated by values and commitment to their vocation. According to the school directors, teachers see themselves as doing the best they can, even under difficult circumstances. In this view the SNED awards are seen as acknowledgement of what teachers are doing in any event, rather than as recognition of excellence or special efforts. To a considerable extent directors' comments indicate that they share these views.

In the same vein, directors emphasize that teachers would object to evaluations of their work based solely on the SIMCE tests, which do not take into account important factors such as student learning in areas other than Spanish and mathematics, nor of their role in inculcating values and attitudes in the students. This criticism has been voiced by the teachers' union, although the union has not opposed the SNED system.

Some directors doubted that SNED would motivate teachers to greater effort. The evaluators quoted statements indicating that the contribution of SNED to teacher motivation is "fragile" because of the strong teachers' culture or cultura docente. Some directors felt that what would make a difference in teacher performance would be a general salary increase of significant magnitude, greater public recognition of teachers' efforts, and substantive participation of the teachers' union in design and implementation of education policies. In the directors' opinions, teachers tend to be convinced they are doing a good job on the basis of their own professional commitment and values, regardless of monetary awards. This is borne out by responses to the teachers' questionnaire discussed below.

Survey Data on Teachers' Reactions

The teachers' survey found that teachers tend to accept "the Chilean model of education", including the voucher system and co-existence of municipal and private-subsidized schools. There is not much difference between the attitudes of teachers in award-winning schools and others, but teachers in private-subsidized schools showed significantly greater acceptance of the "Chilean model" than those in the municipal schools.

There was fairly high acceptance of the concept of evaluating schools and awarding prizes on the basis of performance, especially on the part of teachers in private-subsidized schools. Teachers in both municipal and private-subsidized schools that won awards agreed with the statement that such awards can bring about improvements in education. Teachers in losing schools were less in agreement with such statements.

Teachers' responses indicated a generally positive attitude toward the design of the SNED system, although a significant percentage found the design complex. There was some concern about the indicators used in the SNED index, including both the categories and their weightings. In general the concern focused on the relatively heavy weight given to SIMCE achievement test scores. The concern was greater on the part of teachers in private-subsidized schools that *did not* win awards. Some teachers would have preferred more use of qualitative indicators, although at the same time they approved of the relative transparency of the present design.

The survey found that teachers evaluate their own work quite highly, regardless of whether their school won an award or not. Seventy-four percent of teachers in schools that did not receive awards classified their own teaching performance as good or very good. This finding coincides with comments of directors that teachers are fairly complacent about the quality of their own work.

The survey was administered in 1997, shortly after the first round of SNED evaluation and awards. It found that teachers did not have very complete or accurate information about SNED, especially teachers in schools that had not won awards. This, together with similar findings about directors' knowledge of SNED, led the evaluators to recommend strongly that the Ministry of Education undertake an information campaign to increase understanding of SNED. Unless there is full and accurate information about the system, it cannot have the desired impact on the quality of teaching. As a result, the ministry has taken effective steps to implement an information campaign.

Conclusions and Implications for Policy

The SNED system of merit awards to schools has been carefully designed and well implemented. As SNED enters its third two-year round of measurement and awards (2000-2001), it appears to be accepted by key actors in the education sector. The managers of the system in Chile's Ministry of Education have been concerned to evaluate how it is progressing and make adjustments as needed. It is too soon to say whether this approach to providing money incentives to improve teaching performance is having its desired effect in terms of improving student learning but, with a cost equal to roughly one percent of the vouchers paid to schools and indications of positive impact on the attitudes of teachers and school directors, the experiment appears to be worth the effort.

As a system of awards to establishments rather than to individuals, the SNED system avoids some of the problems associated with merit pay for teachers identified by Murnane and Cohen in their important 1986 article.[16] That study found that transaction costs associated with measuring the performance of individual teachers are an important reason merit pay schemes do not work. Since SNED takes the school rather than the teacher as the unit of observation and award, it avoids the difficult measurement problems arising from what Murnane and Cohen call "the nature of teachers' work" and the need to provide objective indicators.

There are three broad categories of incentive systems to improve educational performance: (1) systems of rewards for good performance, which can include "merit pay" to individuals for excellence in teaching or merit awards to school establishments; (2) systems offering "choice" that provide an alternative to public education and introduce competition; and (3) systems of external standards that provide a yardstick for measuring how well schools are performing and pose varying degrees of "threat" to those that are performing poorly. Chile is applying all three of these: the SNED system of merit awards to schools, its voucher or subvention system, and the SIMCE testing system that provides public information on how well individual schools are performing. It is well to bear this in mind because it will complicate any eventual attempt to attribute improvements in education to any one of these interventions.

Since the SIMCE tests were already in existence, the incremental costs of creating the information needed for SNED was very low. They included only the cost of analyzing the data for the SNED index, plus the cost of the survey used to gather data for some of the non-SIMCE variables that are the basis for other factors in the index. This means that a country that has no system of testing that

[16] Murnane, Richard and David Cohen (1986). *Op. cit.*

measures all schools (instead of a sample) would face both the costs developing the testing system and all the negotiation costs involved in establishing it and developing its credibility.
The managers of the SNED system have taken pains to evaluate the system and make changes to improve it. Following the first round of SNED, there were two evaluation studies: of design and methodology and of different actors' perceptions of the system. Following the second round of SNED (1998-99), an evaluation of perceptions was again carried out, which made it possible to assess changes in understanding of the system and perceptions of it. After the third application of SNED in 2000-2001 the Ministry of Education plans another study that will evaluate whether there have been changes in educational processes as a result of SNED. It is still too soon to evaluate whether SNED has had an impact on student outcomes.

There has been criticism of the low financial value of the SNED awards. Low awards tend to avoid problems of opportunistic behavior on the part of teachers, such as focusing their efforts on the subjects (and possibly on the kinds of students) that would lead to the greatest increases in the performance indicators. Some beneficiaries argue that the awards should be higher. This, however, "raise the stakes" associated with SIMCE and other factors in the SNED index and possibly bring forth opportunistic behavior. The evaluators conclude that it is probably desirable to start with low-level awards, at least until the system is refined and well established.

Reserving ten percent of the awards to reward teachers who have made the greatest contributions to school performance was intended to encourage all teachers to make their best efforts and thereby avoid free-riding on the part of some teachers. A majority of directors, however, have decided to forego this option and distribute the full amount of the award on the same equitable basis as the other 90 percent. This suggests that the transaction costs associated with determining which teachers should receive extra payments outweighed, in the directors' opinion, any benefits in terms of avoiding free-riding.

Information gathered from both school directors and teachers emphasized the importance of feelings of teamwork on the part of teachers, especially in schools that won awards.[17] Directors praised the system of awards to whole schools rather than to individuals because this avoided friction within the school team. In schools that won awards, the reaction among teachers was that it was a recognition of the good work of the team. Although the subject goes far beyond the scope of this paper, these observations suggest that there is a kind of "social capital" that develops in successful schools.

[17] Mizala and Romaguera (1999), p. 24.

A disturbing finding of the evaluation was that most teachers had very little knowledge about SNED. If merit awards are designed to elicit improved performance on the part of teachers, it is essential that the teachers be fully informed about the system. The publication Reconocimiento al Compromiso Docente (1998) represents one step to provide better information about SNED. The ministry is preparing an extensive program of information and training for regional officials in advance of the next iteration of SNED in the period 2000-2001.

A problem that is not addressed in the evaluation or elsewhere is how the SNED system will function on a dynamic basis in the future. The main evaluation of SNED was carried out following the 1996-97 application of SNED (when levels of information about SNED were found to be low.) It is not clear what the experience will be following repeated rounds of measurement and awards. In the school directors' opinion, teachers in schools that won awards in one round of SNED but did not win in subsequent rounds would feel frustrated. Once a school has achieved high levels on the SIMCE tests, it becomes more difficult to score well on the "improvement" portion of the index. And if schools make efforts to improve their performance but still do not win awards, what effect will that have over time?

A related question has to do with the appearance of opportunistic behavior in the future. As SNED becomes better known, teachers and schools directors may devote increasing efforts to improving their schools' scores in ways that do not truly benefit students. These might create distortions in teachers' allocation of time among subjects, encourage schools' efforts to screen students, or motivate schools to urge poor students to stay away on the days tests are administered (as has been observed in countries where "high-stakes" tests are used).

With regard to both these points, it is important to note that the SNED system considers not only SIMCE scores and changes therein but also other factors that make up 35 percent of the index. The inclusion of other factors in the index provides ways other than scoring high on SIMCE for schools to win awards and will reduce propensities to engage in opportunistic behavior with regard to the tests. It is also the case that the variables included in the factors comprising the index (and even the weights of factors) will be the subject of continued evaluation and possible change in the future.

Chile's merit award system is compatible with the teacher compensation strategy recommended by Odden and Kelley (1996).[18] Some observers, including school directors in Chile, argue that what is needed to stimulate better teaching performance is a general salary increase for all teachers. But

[18] Odden, Allan and Carolyn Kelley, *Paying Teachers for What They Know and Do*. Thousand Oaks, California: Corwin Press, 1996. See especially pp. 112 ff.

Chile's SNED, by providing salary complements based on "high standards, high performance," as advocated by Odden and Kelley, is currently the best developing country example of recommended international practice.

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